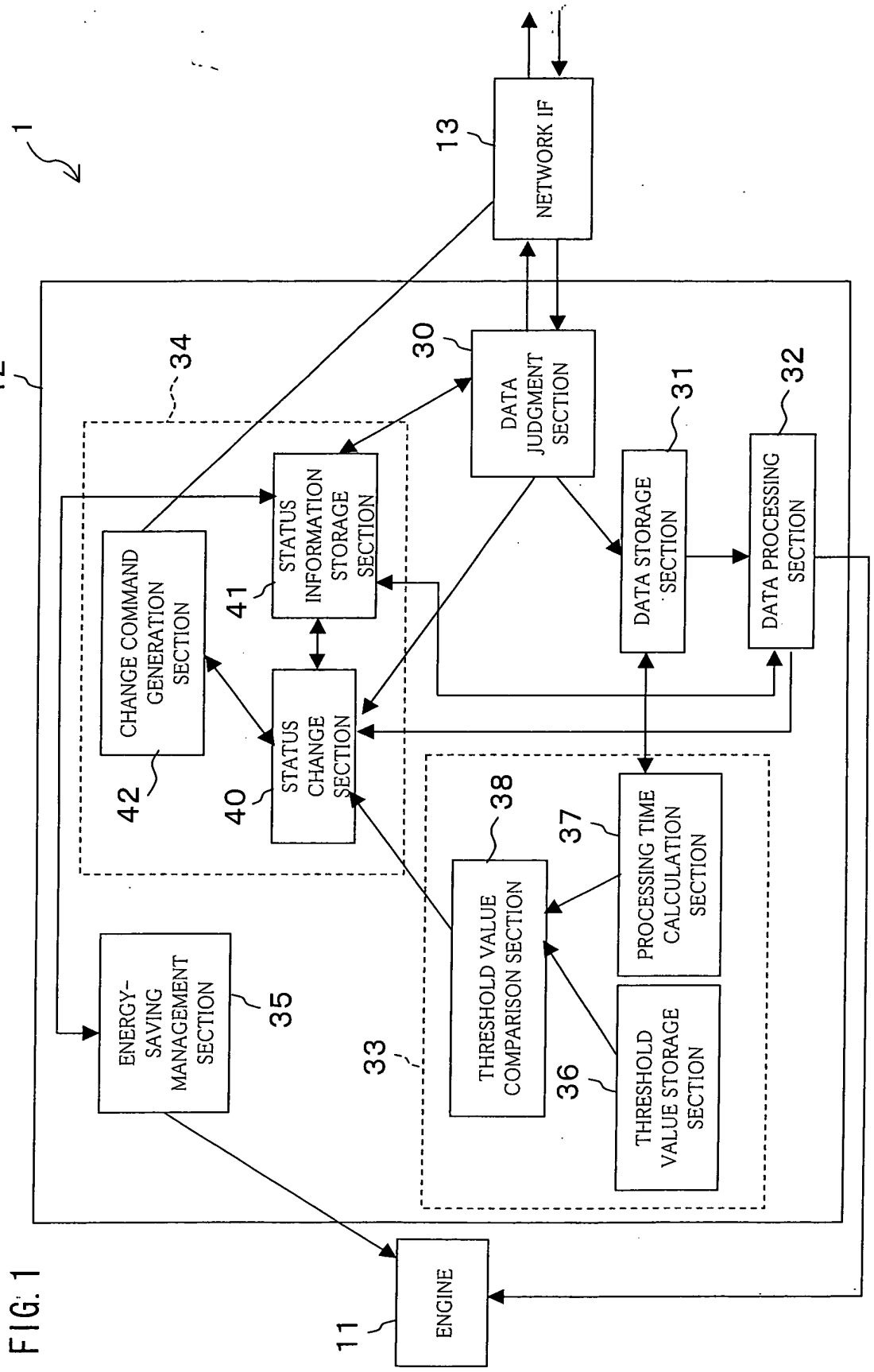

1
12
13
NETWORK IF
30
DATA JUDGMENT SECTION
31
DATA STORAGE SECTION
32
DATA PROCESSING SECTION
34
STATUS INFORMATION STORAGE SECTION
41
CHANGE COMMAND GENERATION SECTION
42
STATUS CHANGE SECTION
40
33
38
THRESHOLD VALUE COMPARISON SECTION
37
PROCESSING TIME CALCULATION SECTION
36
THRESHOLD VALUE STORAGE SECTION
ENERGY-SAVING MANAGEMENT SECTION
35
ENGINE
11

FIG. 1

FIG. 2

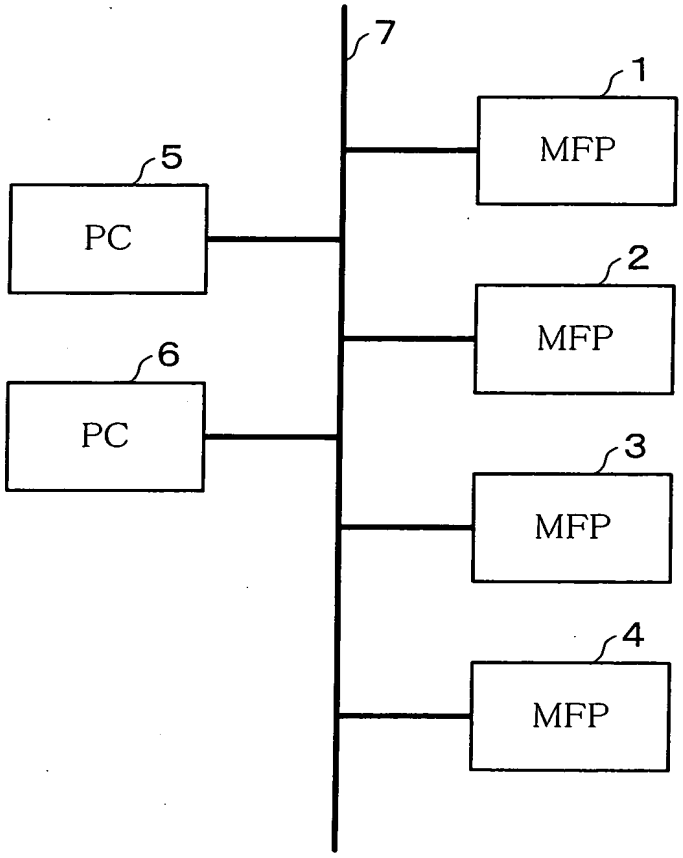


FIG. 3

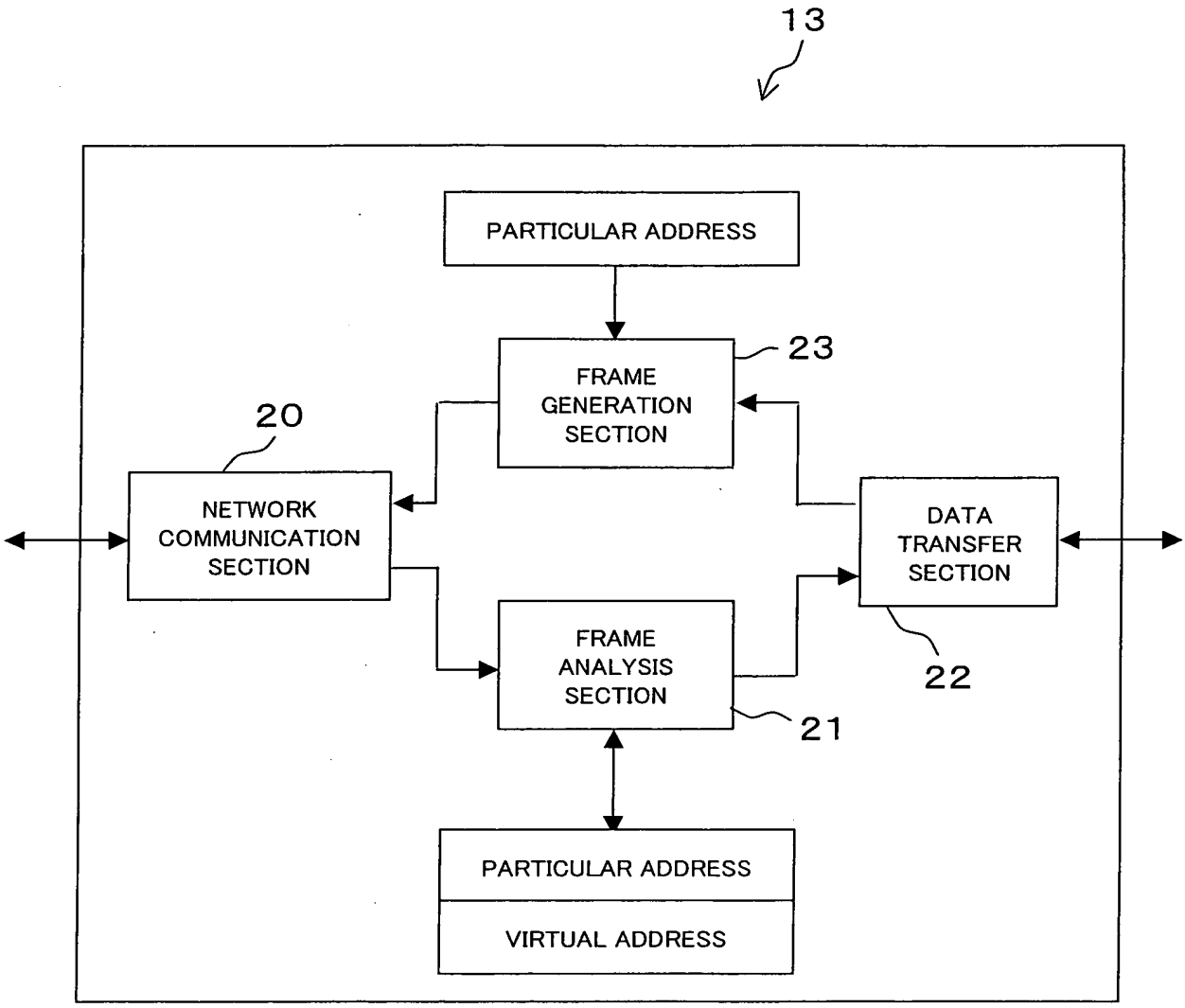
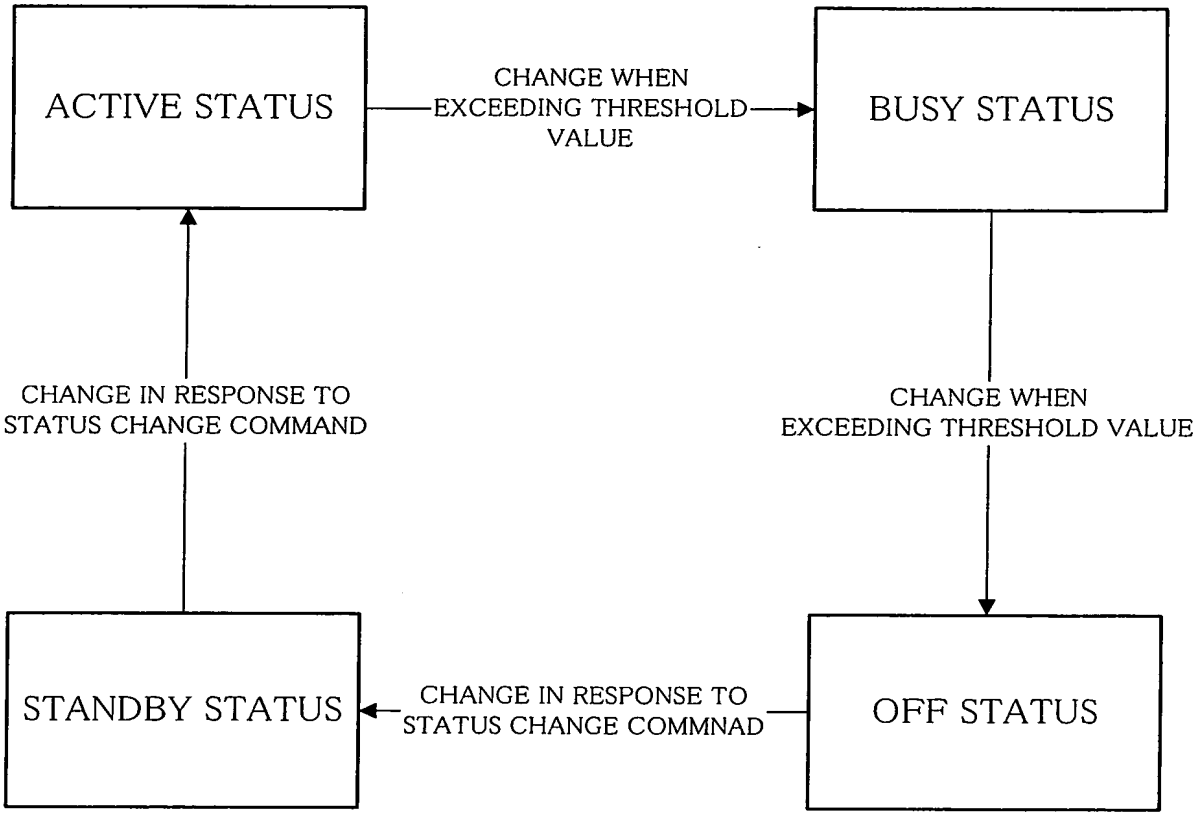

13
PARTICULAR ADDRESS
23
FRAME GENERATION SECTION
20
NETWORK COMMUNICATION SECTION
DATA TRANSFER SECTION
22
FRAME ANALYSIS SECTION
21
PARTICULAR ADDRESS
VIRTUAL ADDRESS

FIG. 4


ACTIVE STATUS
CHANGE WHEN EXCEEDING THRESHOLD VALUE
BUSY STATUS
CHANGE IN RESPONSE TO STATUS CHANGE COMMAND
CHANGE WHEN EXCEEDING THRESHOLD VALUE
STANDBY STATUS
CHANGE IN RESPONSE TO STATUS CHANGE COMMNAD
OFF STATUS

IN EXECUTION

FIG.5(a)

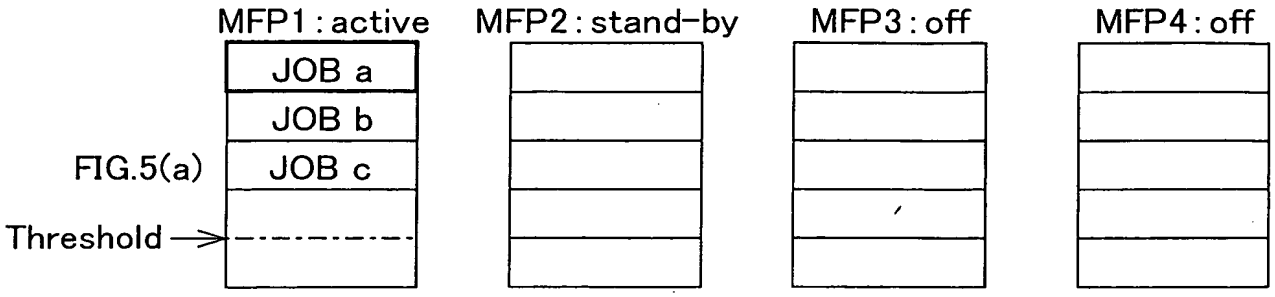


FIG.5(b)

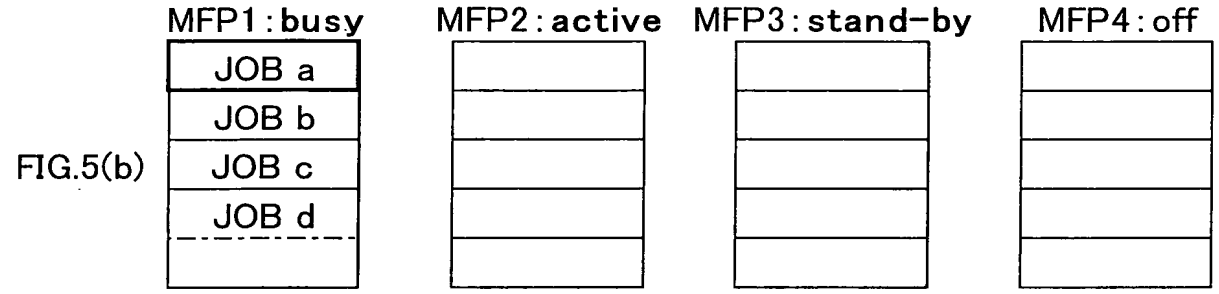


FIG.5(c)

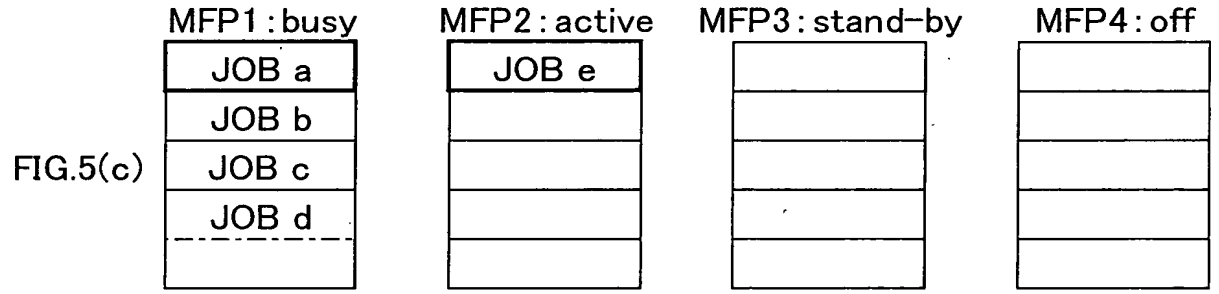


FIG.5(d)

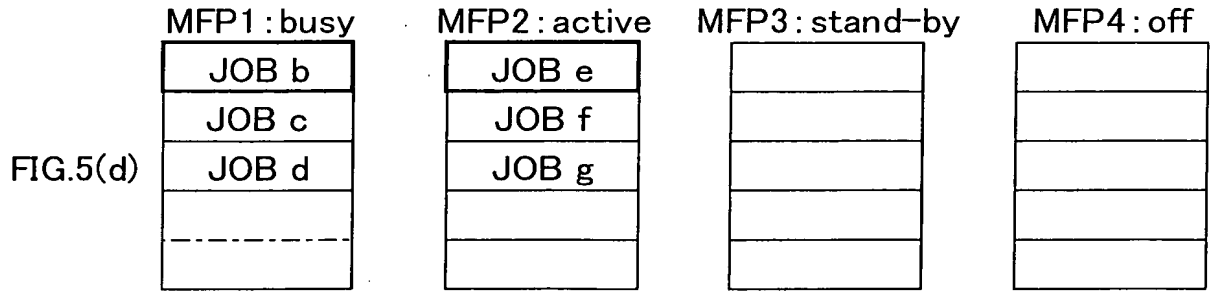
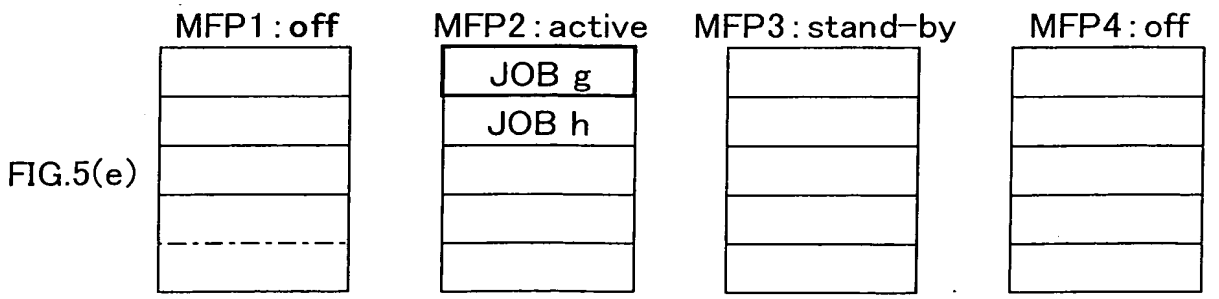


FIG.5(e)



IN EXECUTION

FIG.6(a)

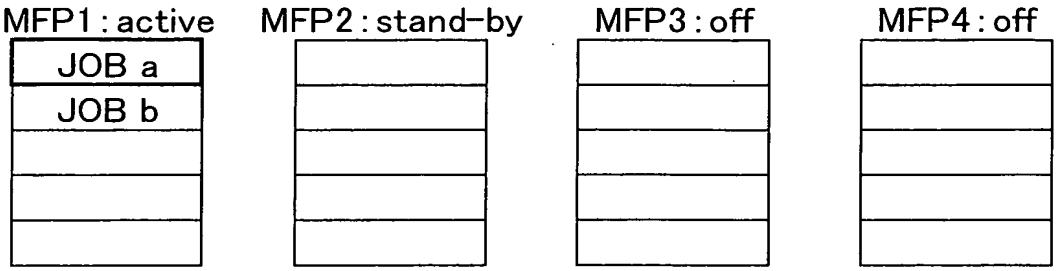


FIG.6(b)

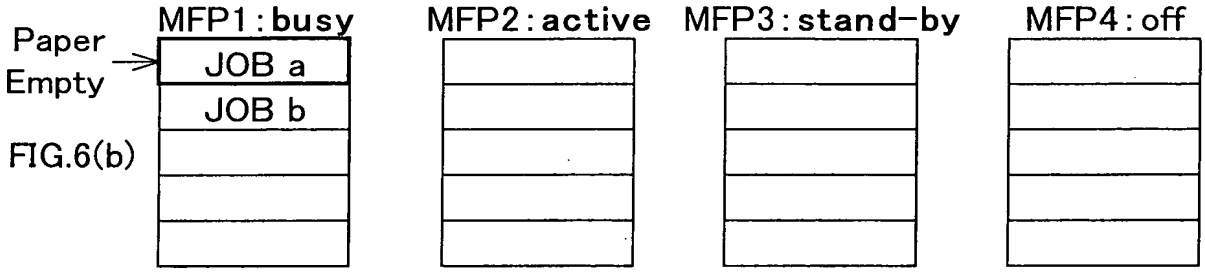


FIG.6(c)

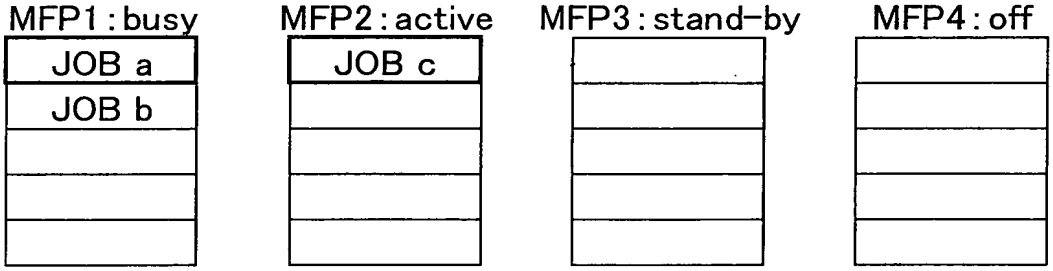


FIG.6(d)

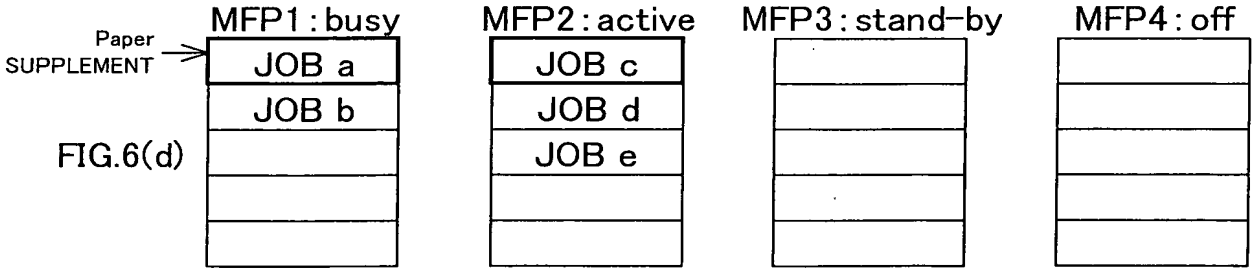


FIG.6(e)

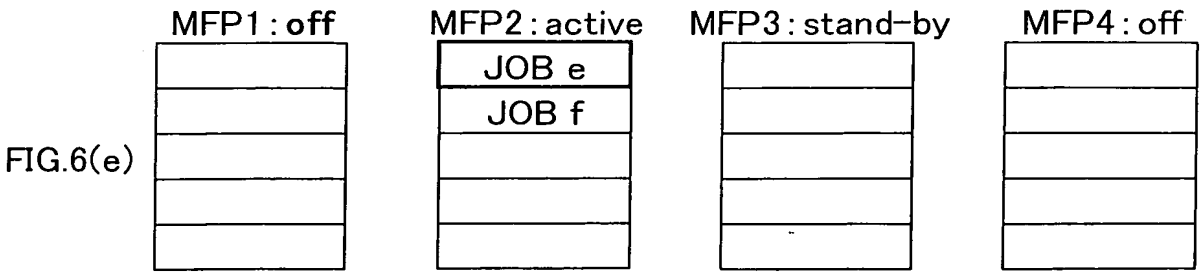


FIG. 7

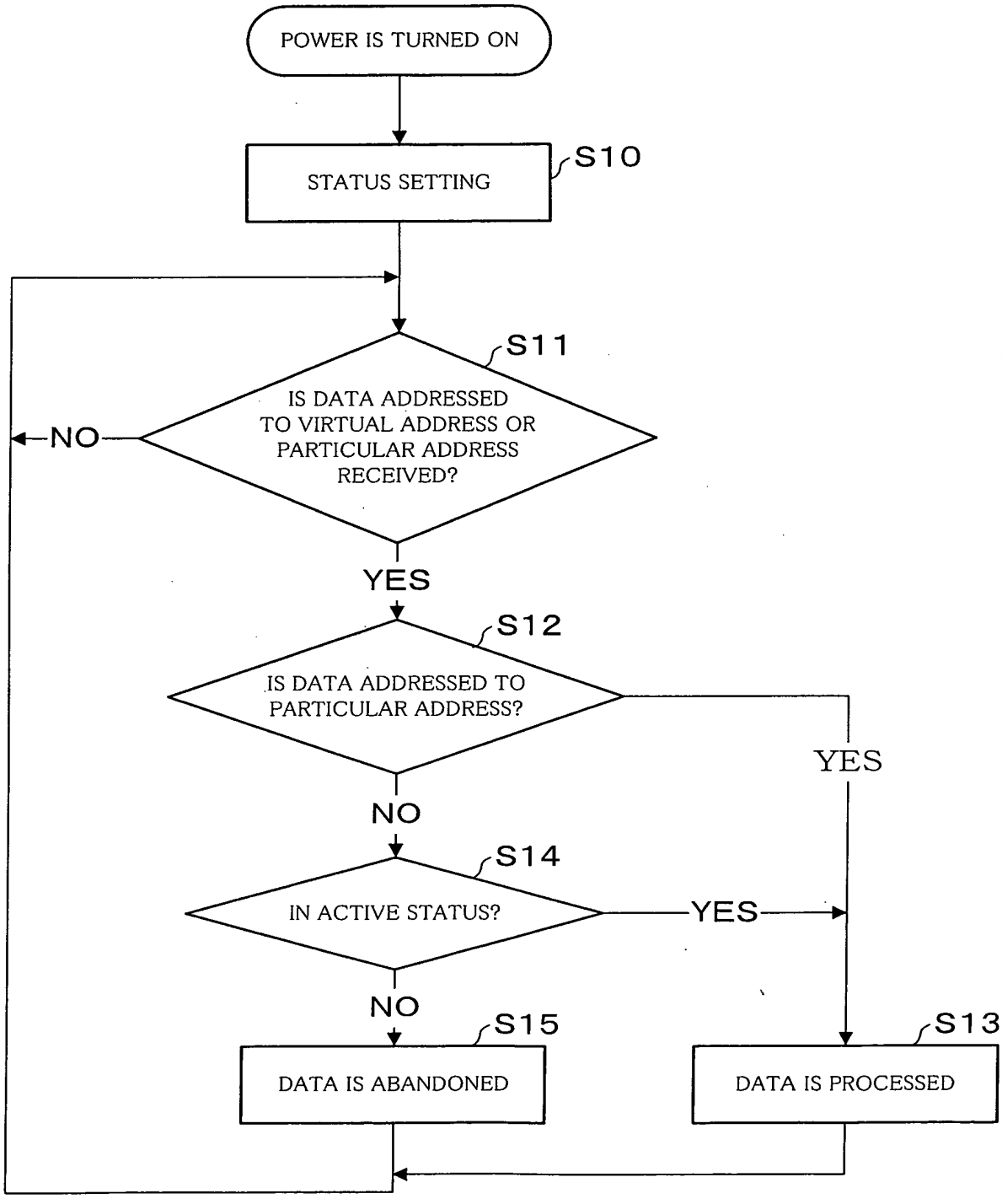

POWER IS TURNED ON
STATUS SETTING
S10
S11
IS DATA ADDRESSED TO VIRTUAL ADDRESS OR PARTICULAR ADDRESS RECEIVED?
NO
YES
S12
IS DATA ADDRESSED TO PARTICULAR ADDRESS?
YES
NO
S14
IN ACTIVE STATUS?
YES
NO
S15
DATA IS ABANDONED
S13
DATA IS PROCESSED

FIG. 8

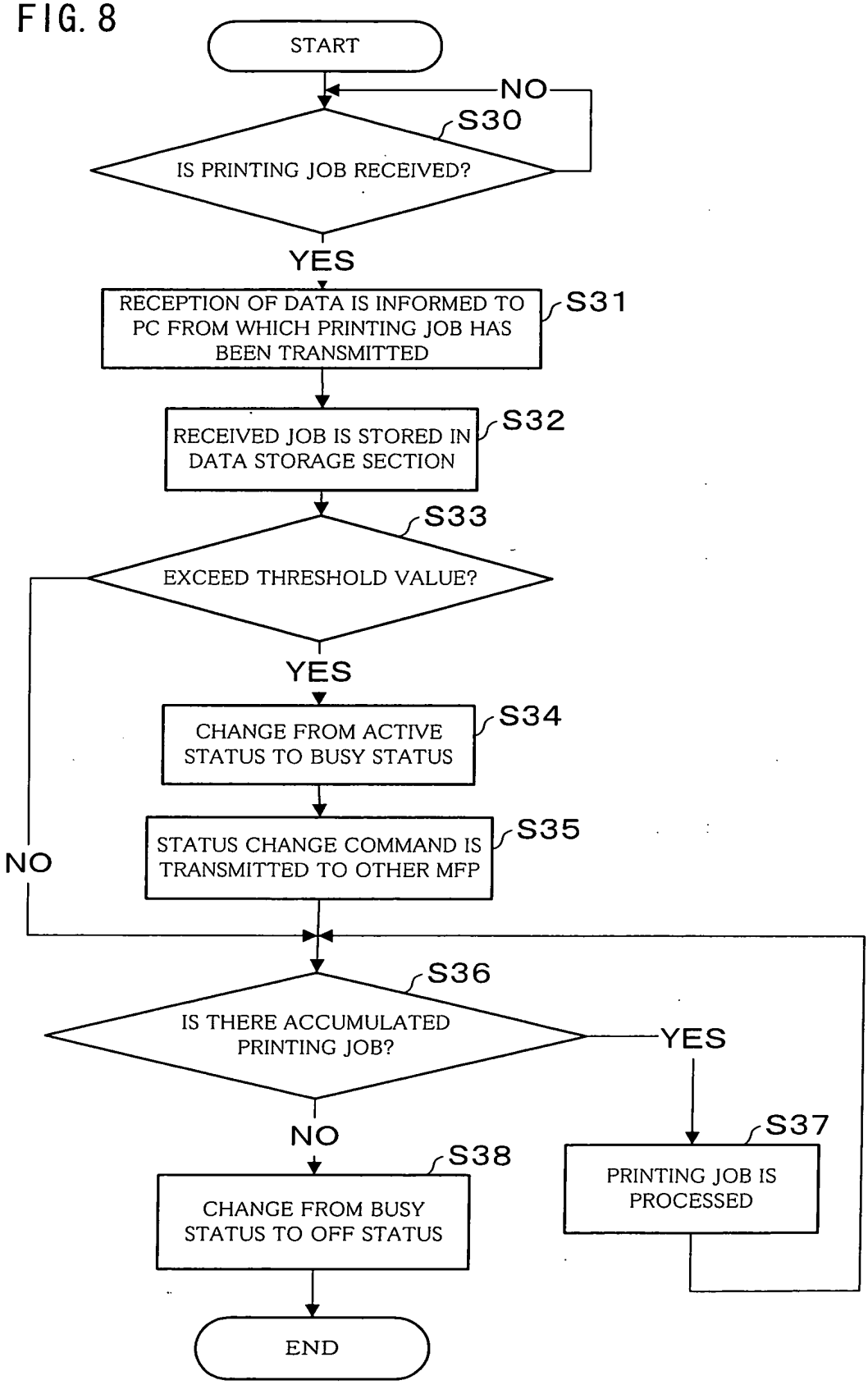

START
NO
S30
IS PRINTING JOB RECEIVED?
YES
RECEPTION OF DATA IS INFORMED TO PC FROM WHICH PRINTING JOB HAS BEEN TRANSMITTED
S31
RECEIVED JOB IS STORED IN DATA STORAGE SECTION
S32
S33
EXCEED THRESHOLD VALUE?
YES
CHANGE FROM ACTIVE STATUS TO BUSY STATUS
S34
STATUS CHANGE COMMAND IS TRANSMITTED TO OTHER MFP
S35
NO
S36
IS THERE ACCUMULATED PRINTING JOB?
YES
NO
S37
PRINTING JOB IS PROCESSED
S38
CHANGE FROM BUSY STATUS TO OFF STATUS
END

FIG. 9

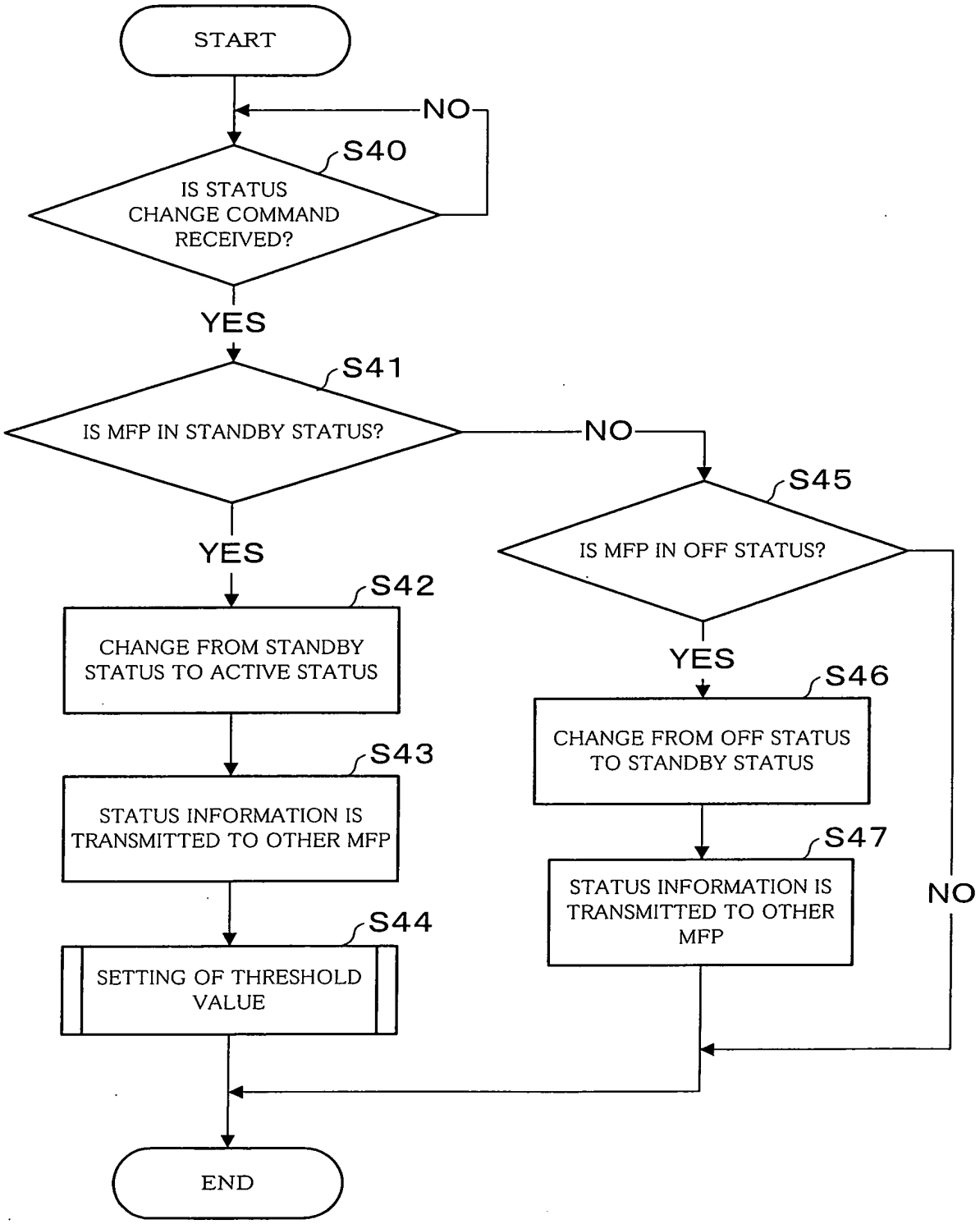

START
NO
S40
IS STATUS CHANGE COMMAND RECEIVED?
YES
S41
IS MFP IN STANDBY STATUS?
NO
S45
IS MFP IN OFF STATUS?
YES
S42
CHANGE FROM STANDBY STATUS TO ACTIVE STATUS
S43
STATUS INFORMATION IS TRANSMITTED TO OTHER MFP
S44
SETTING OF THRESHOLD VALUE
YES
S46
CHANGE FROM OFF STATUS TO STANDBY STATUS
S47
STATUS INFORMATION IS TRANSMITTED TO OTHER MFP
NO
END

FIG. 10

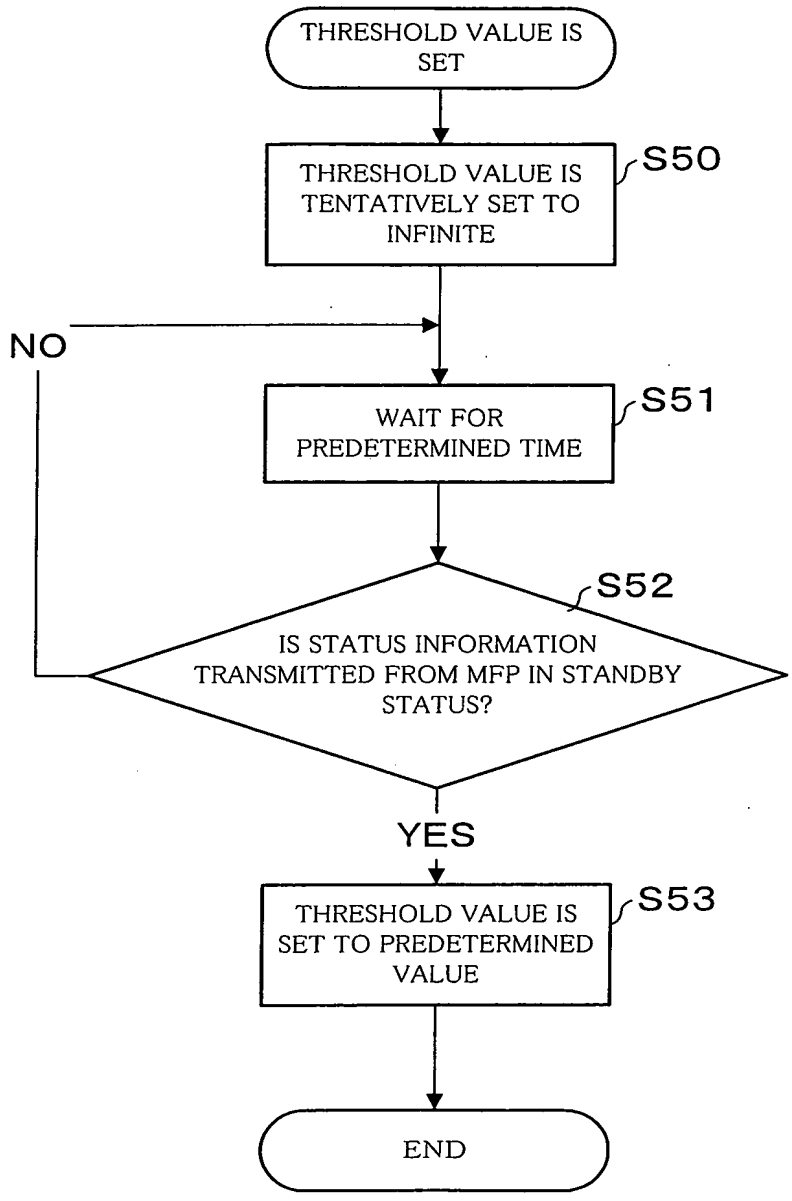
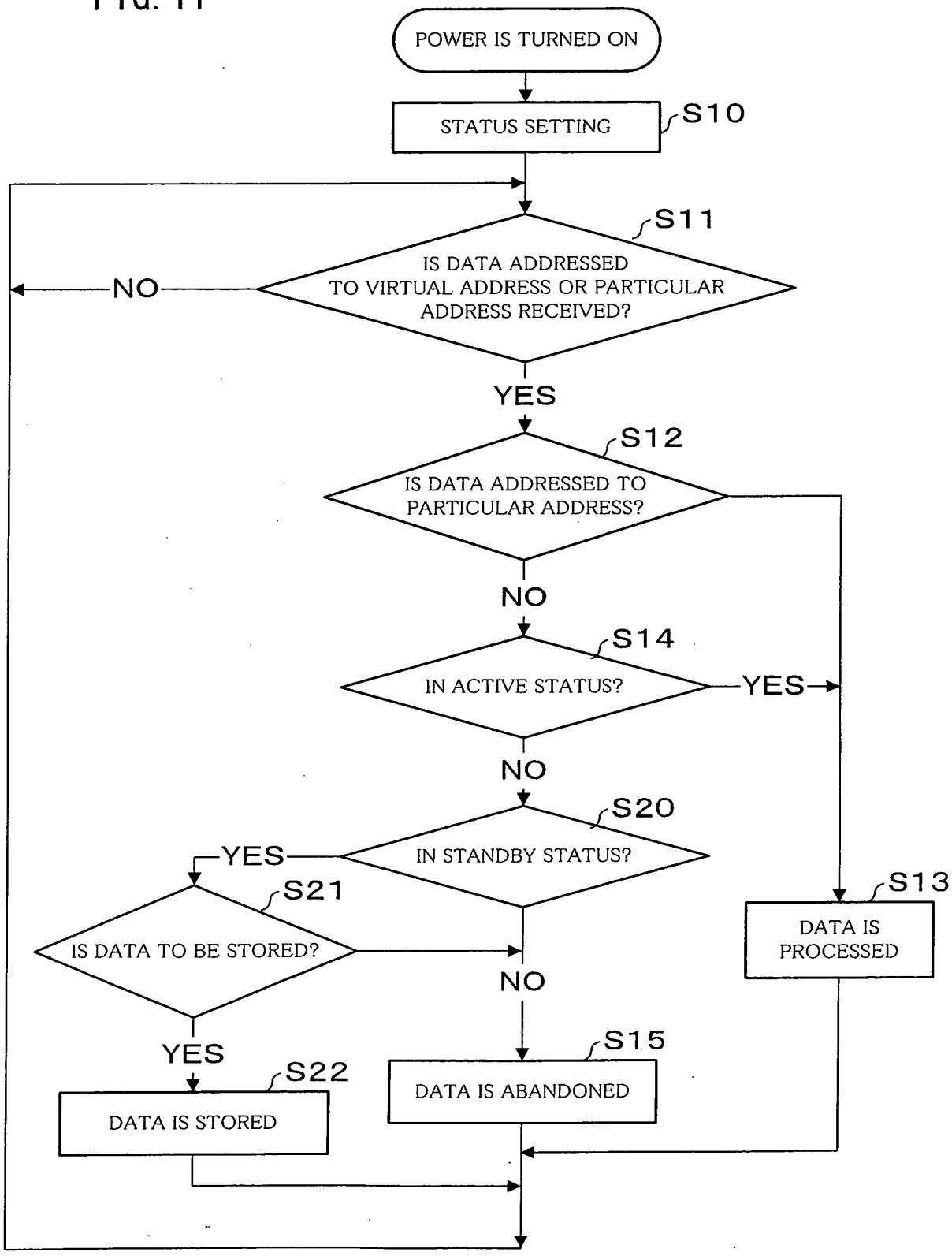

THRESHOLD VALUE IS SET
THRESHOLD VALUE IS TENTATIVELY SET TO INFINITE
S50
NO
WAIT FOR PREDETERMINED TIME
S51
S52
IS STATUS INFORMATION TRANSMITTED FROM MFP IN STANDBY STATUS?
YES
THRESHOLD VALUE IS SET TO PREDETERMINED VALUE
S53
END

FIG. 11


POWER IS TURNED ON
STATUS SETTING
S10
S11
IS DATA ADDRESSED TO VIRTUAL ADDRESS OR PARTICULAR ADDRESS RECEIVED?
NO
YES
S12
IS DATA ADDRESSED TO PARTICULAR ADDRESS?
NO
S14
IN ACTIVE STATUS?
YES
NO
S20
IN STANDBY STATUS?
YES
S21
IS DATA TO BE STORED?
NO
YES
S22
DATA IS STORED
S15
DATA IS ABANDONED
S13
DATA IS PROCESSED

IN EXECUTION

FIG.12(a)

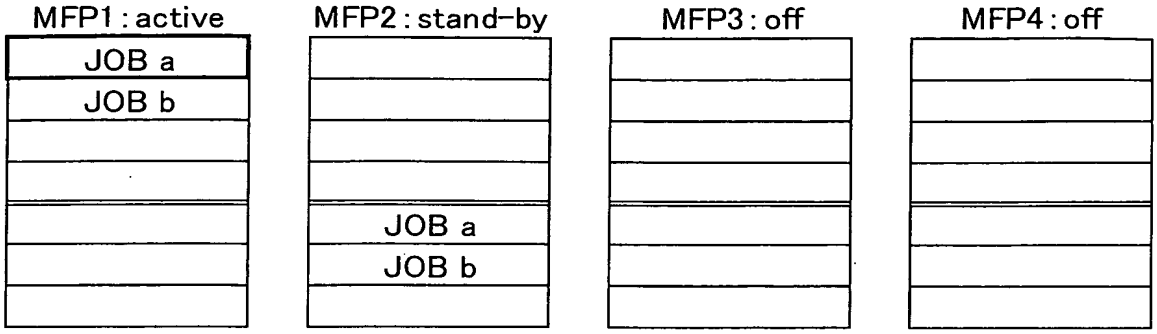
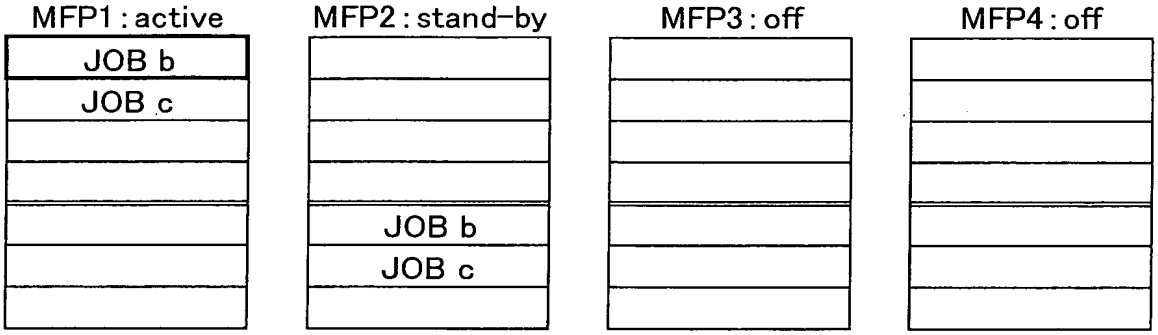


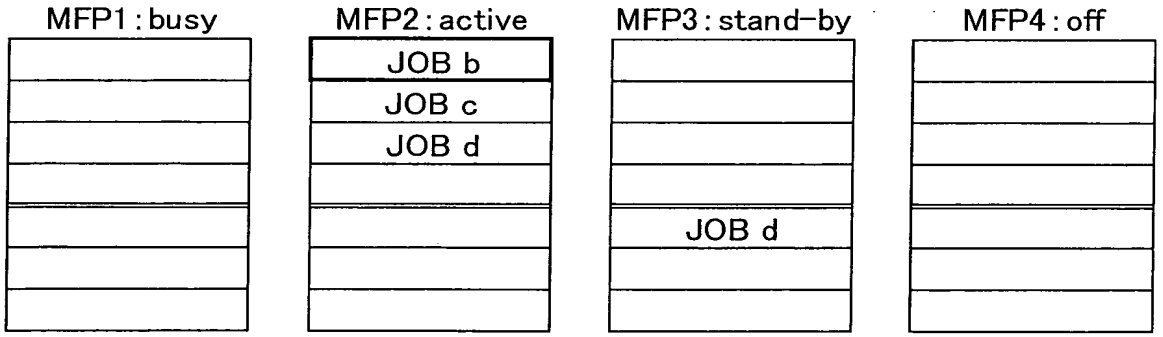
FIG.12(b)



ERROR OCCURS

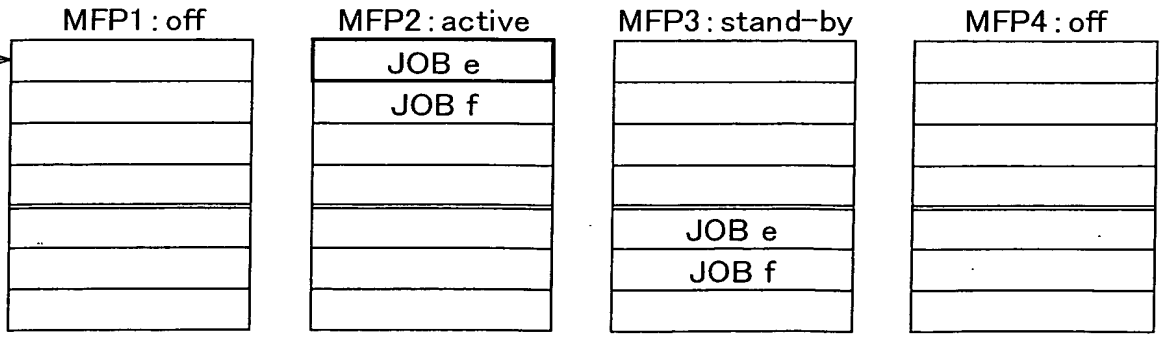
FIG.12(c)

FIG.12(d)



ERROR IS RELEASED

FIG.12(e)



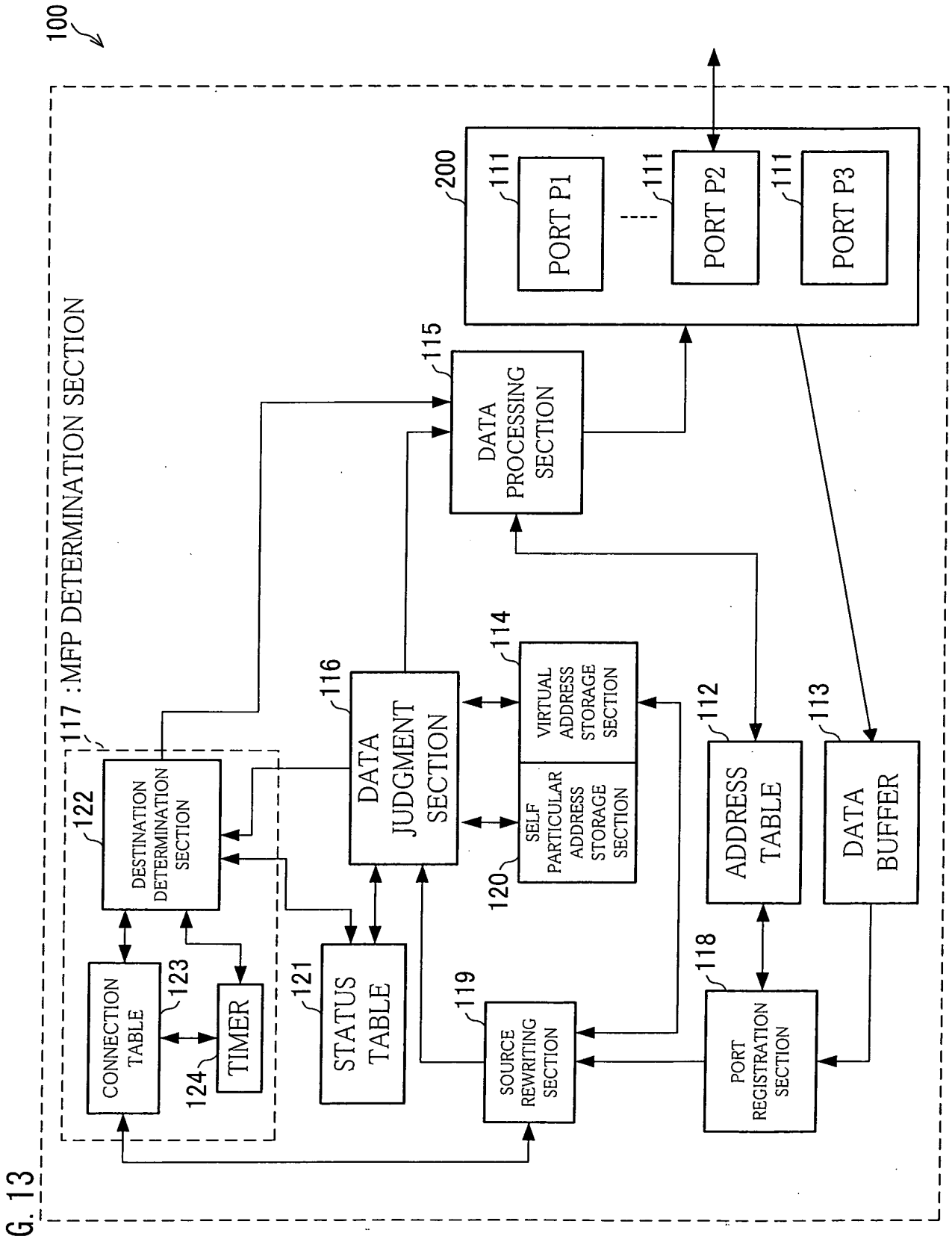

100
117 :MFP DETERMINATION SECTION
200
111
PORT P1
111
PORT P2
111
PORT P3
115
DATA PROCESSING SECTION
116
DATA JUDGMENT SECTION
114
VIRTUAL ADDRESS STORAGE SECTION
SELF PARTICULAR ADDRESS STORAGE SECTION
120
112
ADDRESS TABLE
113
DATA BUFFER
122
DESTINATION DETERMINATION SECTION
123
CONNECTION TABLE
124
TIMER
121
STATUS TABLE
119
SOURCE REWRITING SECTION
118
PORT REGISTRATION SECTION

FIG. 13

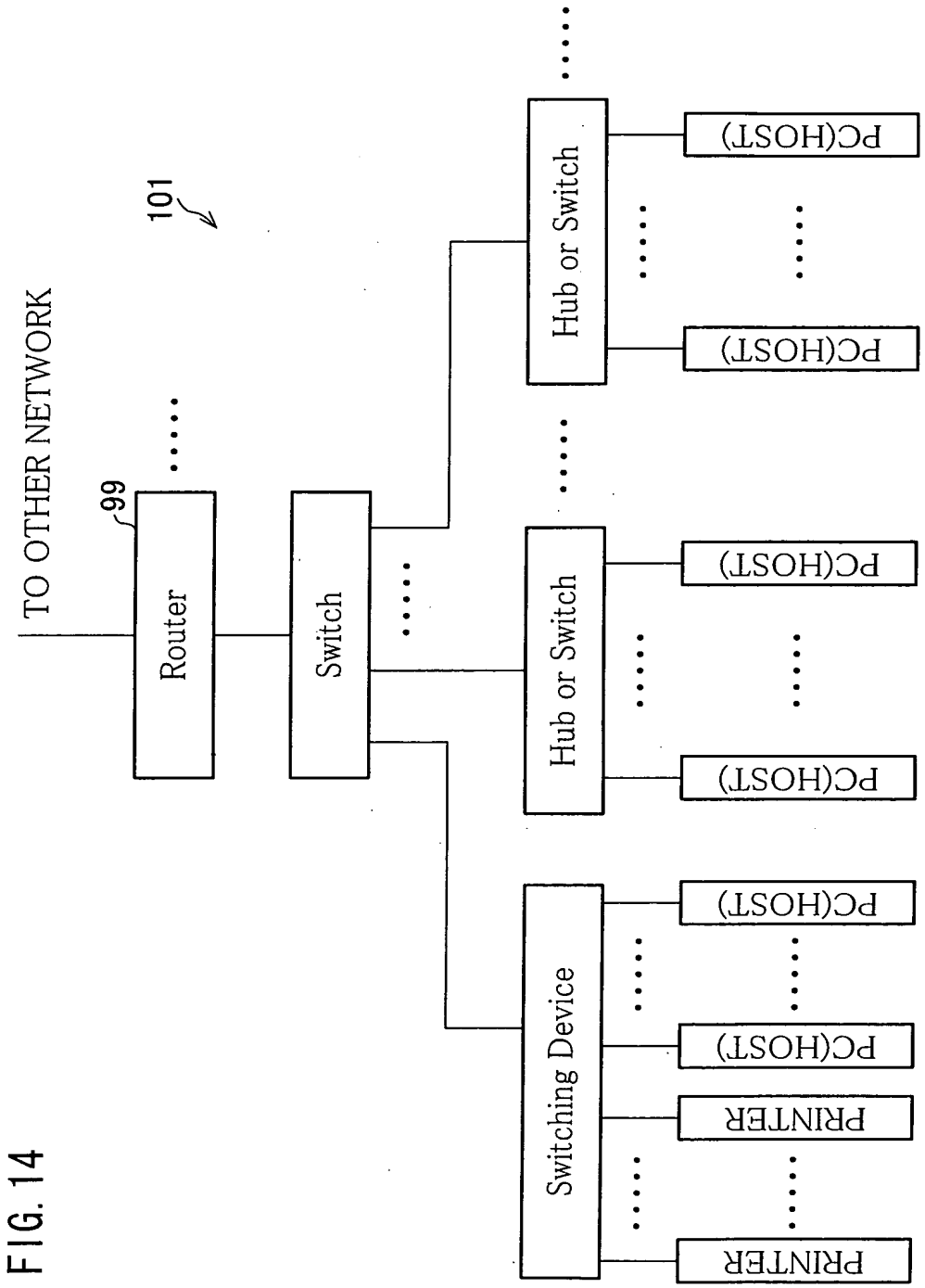

TO OTHER NETWORK
101
99
Router
Switch
Hub or Switch
Hub or Switch
Switching Device
PC(HOST)
PC(HOST)
PC(HOST)
PC(HOST)
PC(HOST)
PRINTER
PRINTER

FIG. 14

FIG. 15

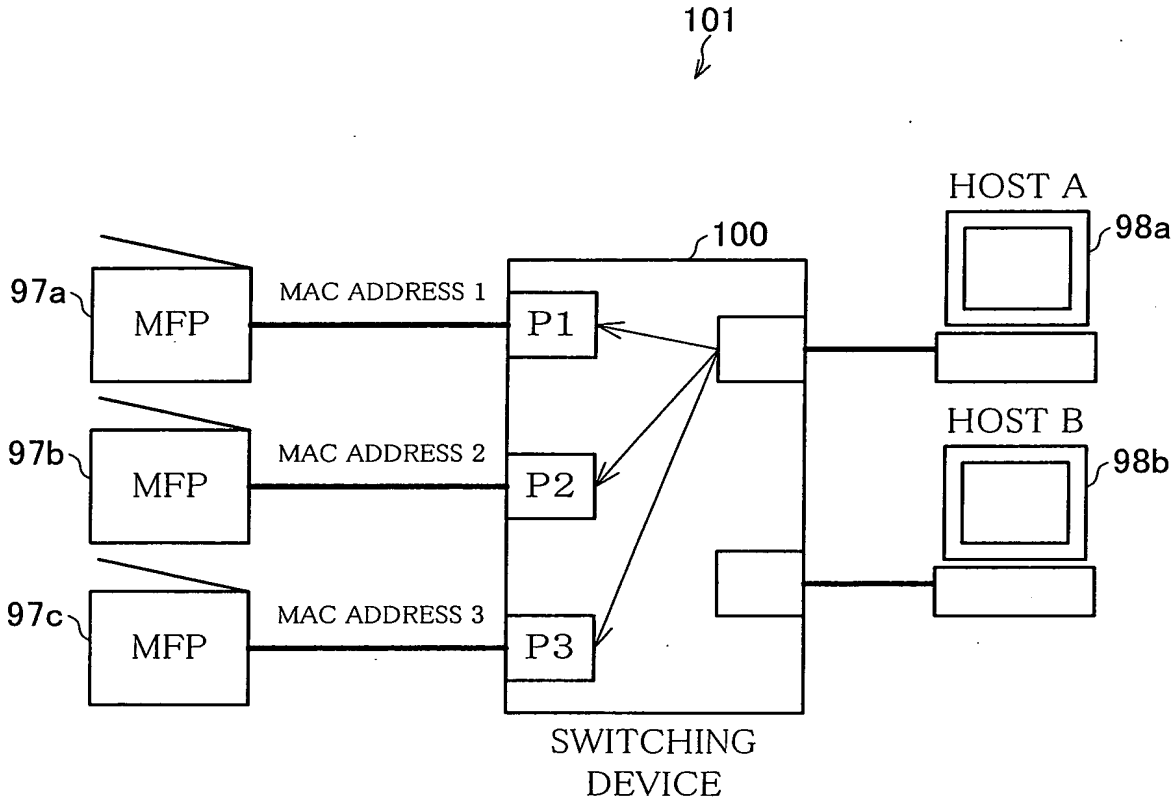

101
HOST A
98a
100
97a
MFP
MAC ADDRESS 1
P1
HOST B
98b
97b
MFP
MAC ADDRESS 2
P2
97c
MFP
MAC ADDRESS 3
P3
SWITCHING
DEVICE

FIG. 16

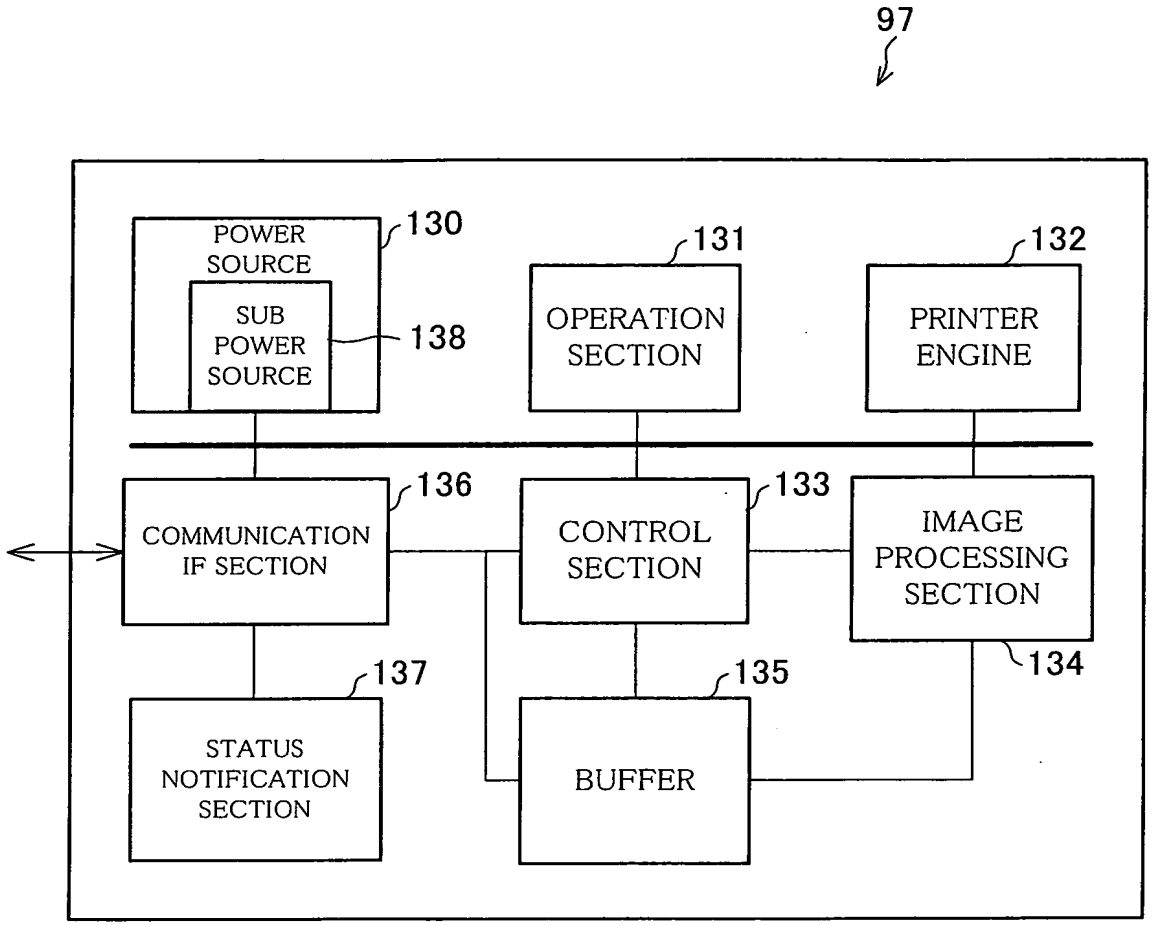

97
POWER SOURCE
130
SUB POWER SOURCE
138
OPERATION SECTION
131
PRINTER ENGINE
132
COMMUNICATION IF SECTION
136
CONTROL SECTION
133
IMAGE PROCESSING SECTION
134
STATUS NOTIFICATION SECTION
137
BUFFER
135

FIG. 17

ADDRESS TABLE

MAC ADDRESS	PORT
MAC ADDRESS 1	P1
MAC ADDRESS 2	P2
MAC ADDRESS 3	P3
MAC ADDRESS A	P4
MAC ADDRESS B	P5

FIG. 18

STATUS TABLE

MAC ADDRESS	DEVICE INFORMATION	PRIORITY VALUE
MAC ADDRESS 1	MFP, ABILITY	100
MAC ADDRESS 2	MFP, ABILITY	80
MAC ADDRESS 3	MFP, ABILITY	60

FIG. 19

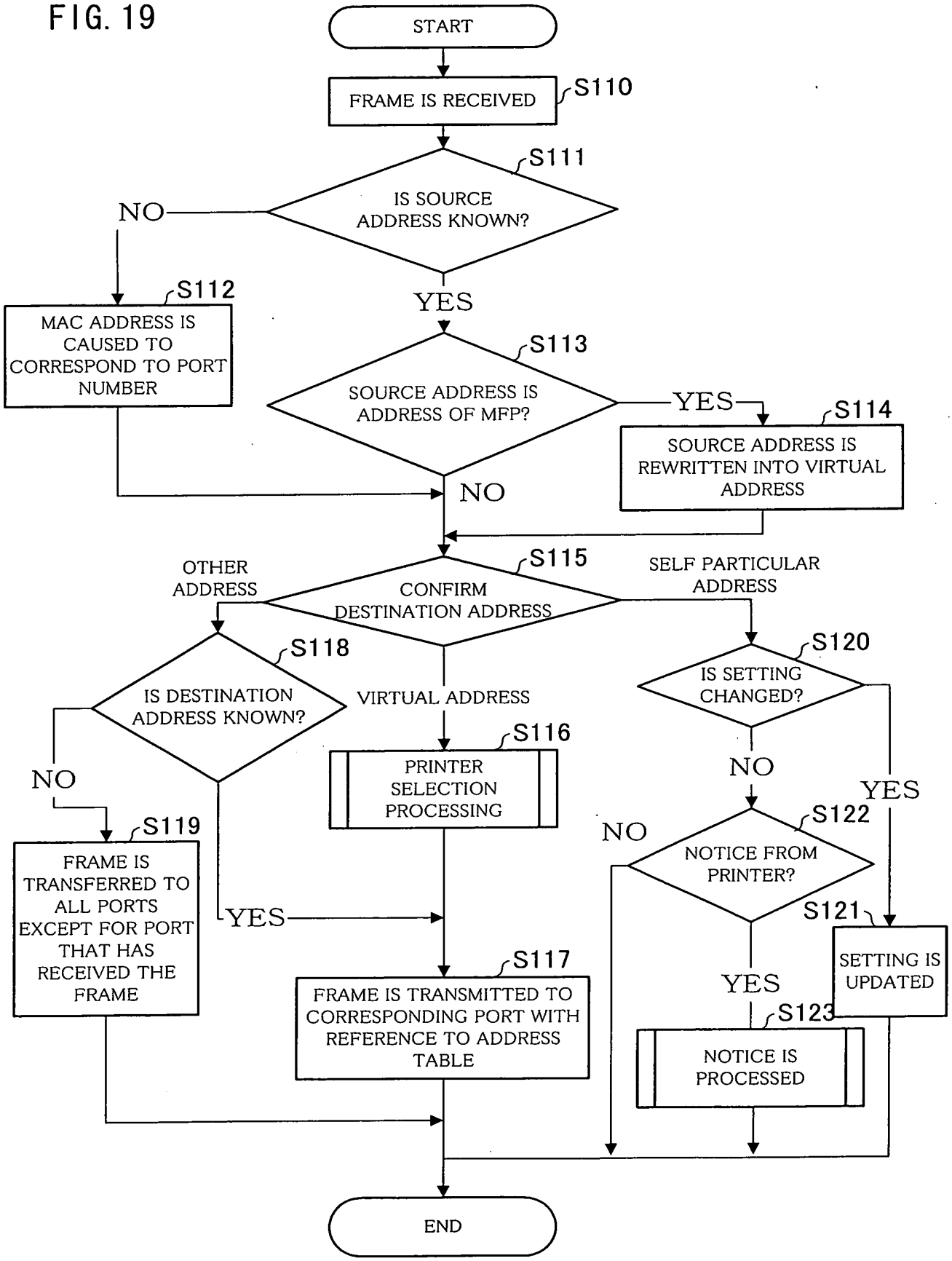

START
FRAME IS RECEIVED
S110
S111
IS SOURCE ADDRESS KNOWN?
NO
YES
S112
MAC ADDRESS IS CAUSED TO CORRESPOND TO PORT NUMBER
S113
SOURCE ADDRESS IS ADDRESS OF MFP?
YES
S114
SOURCE ADDRESS IS REWRITTEN INTO VIRTUAL ADDRESS
NO
S115
CONFIRM DESTINATION ADDRESS
OTHER ADDRESS
SELF PARTICULAR ADDRESS
VIRTUAL ADDRESS
S118
IS DESTINATION ADDRESS KNOWN?
NO
S119
FRAME IS TRANSFERRED TO ALL PORTS EXCEPT FOR PORT THAT HAS RECEIVED THE FRAME
YES
S116
PRINTER SELECTION PROCESSING
S117
FRAME IS TRANSMITTED TO CORRESPONDING PORT WITH REFERENCE TO ADDRESS TABLE
S120
IS SETTING CHANGED?
NO
YES
S122
NOTICE FROM PRINTER?
NO
YES
S121
SETTING IS UPDATED
S123
NOTICE IS PROCESSED
END

FIG. 20

CONNECTION TABLE

HOST MAC ADDRESS	PRINTER MAC ADDRESS	TIMER
MAC ADDRESS A	MAC ADDRESS 1	T1 SECOND
MAC ADDRESS B	MAC ADDRESS 2	T2 SECOND

FIG. 21

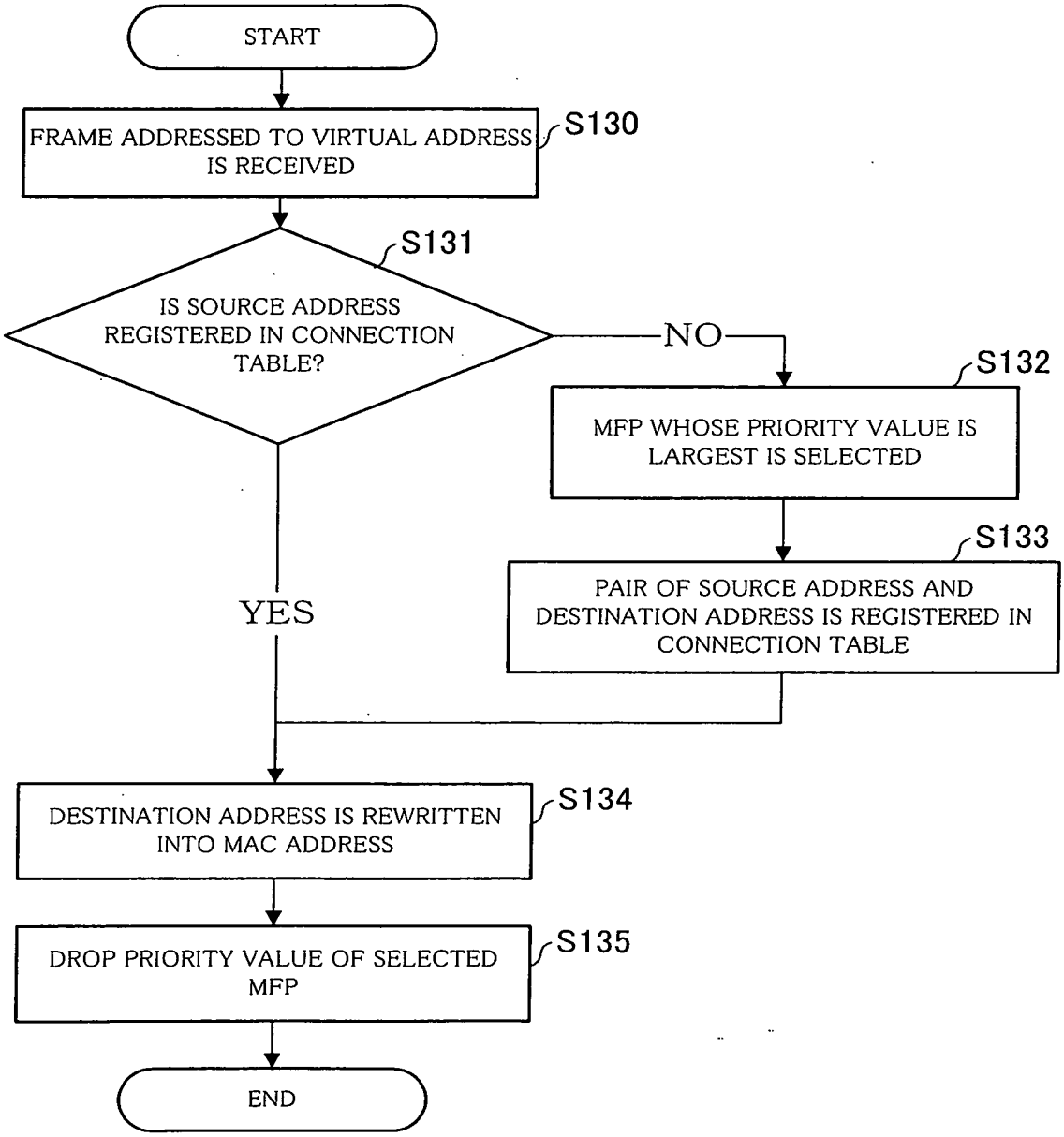
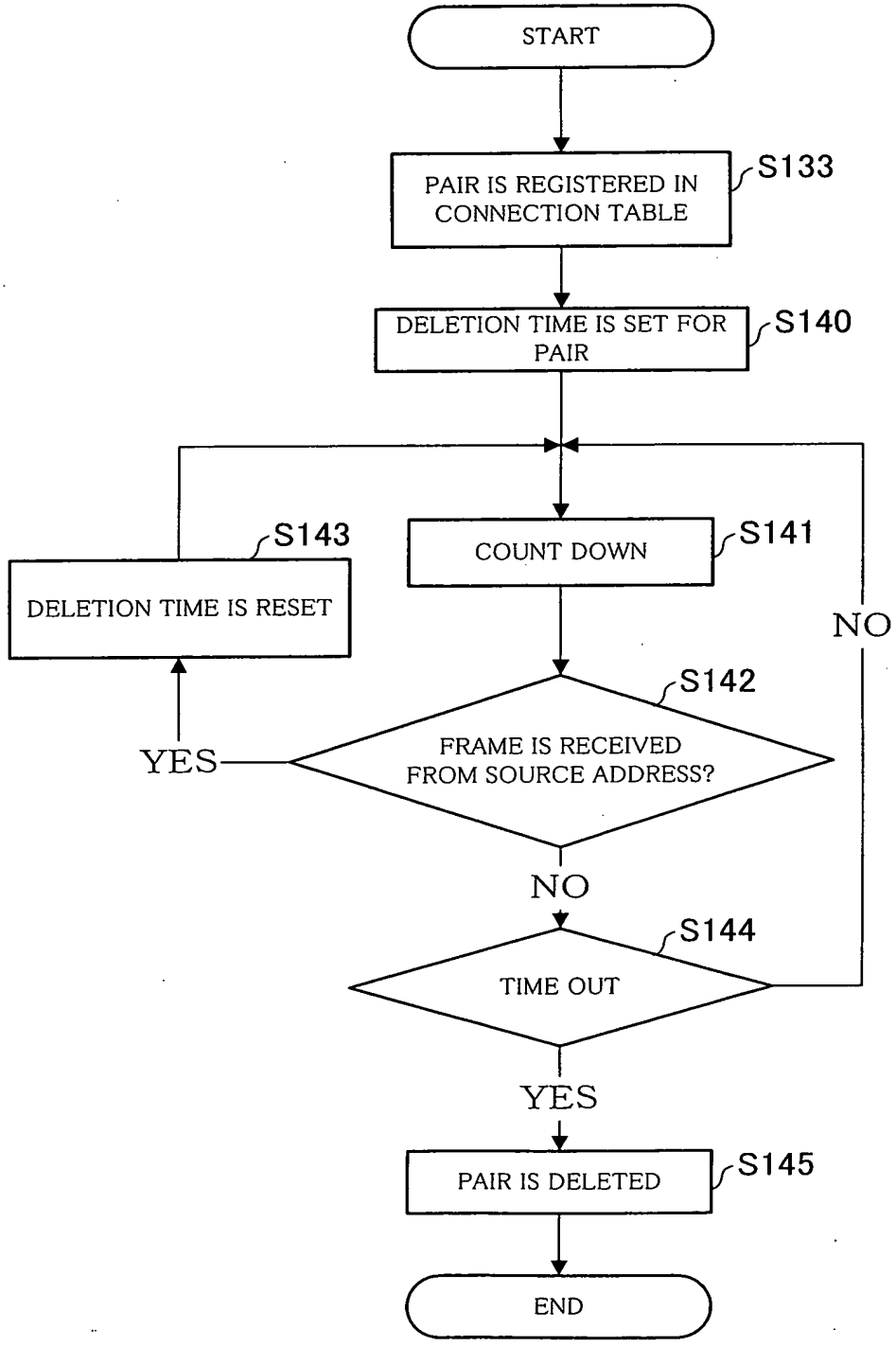


FIG. 22


START
PAIR IS REGISTERED IN CONNECTION TABLE
S133
DELETION TIME IS SET FOR PAIR
S140
COUNT DOWN
S141
FRAME IS RECEIVED FROM SOURCE ADDRESS?
S142
YES
DELETION TIME IS RESET
S143
NO
TIME OUT
S144
NO
YES
PAIR IS DELETED
S145
END

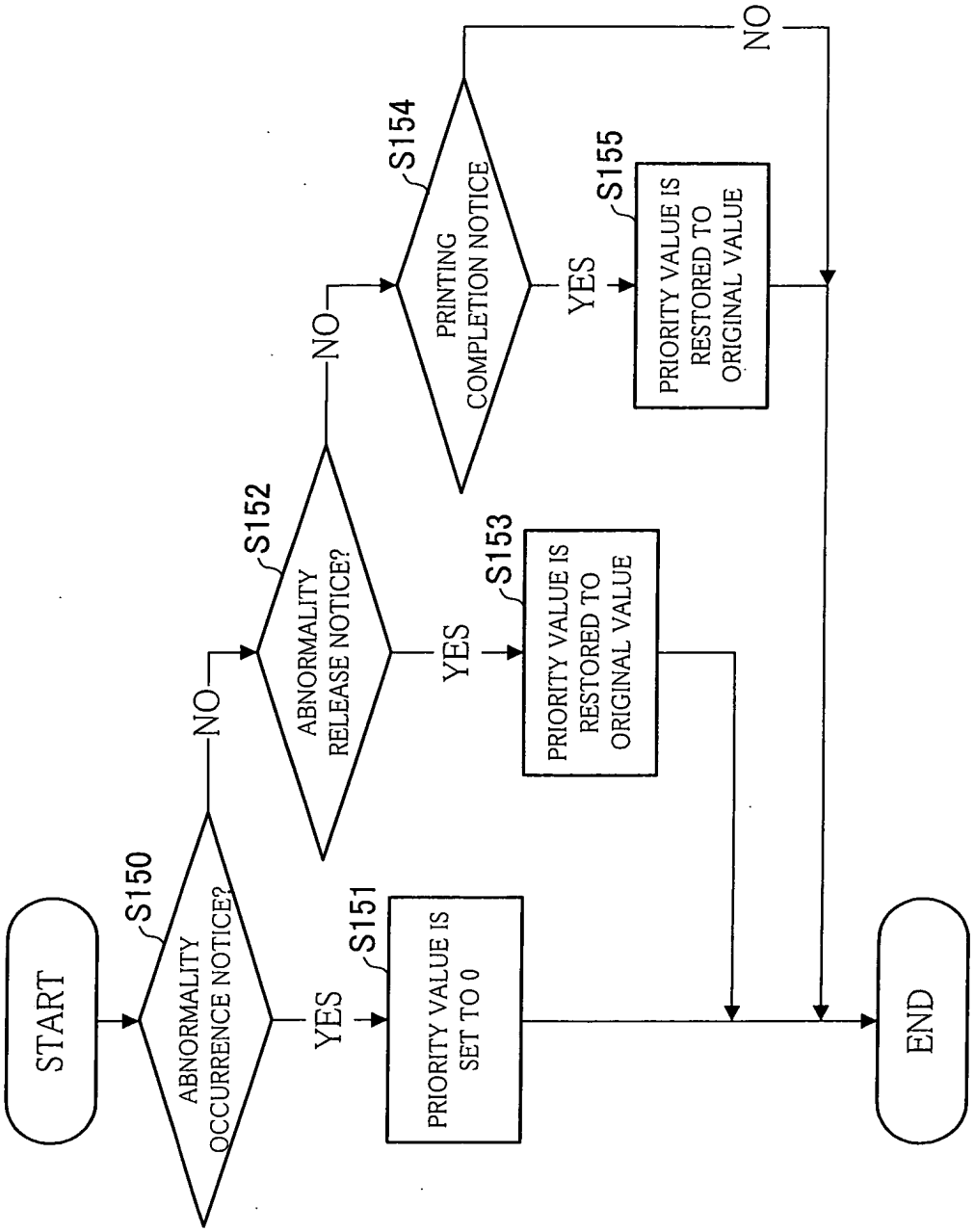

START
S150
ABNORMALITY OCCURRENCE NOTICE?
YES
S151
PRIORITY VALUE IS SET TO 0
NO
S152
ABNORMALITY RELEASE NOTICE?
YES
S153
PRIORITY VALUE IS RESTORED TO ORIGINAL VALUE
NO
S154
PRINTING COMPLETION NOTICE
YES
S155
PRIORITY VALUE IS RESTORED TO ORIGINAL VALUE
NO
END

FIG. 23

FIG. 24

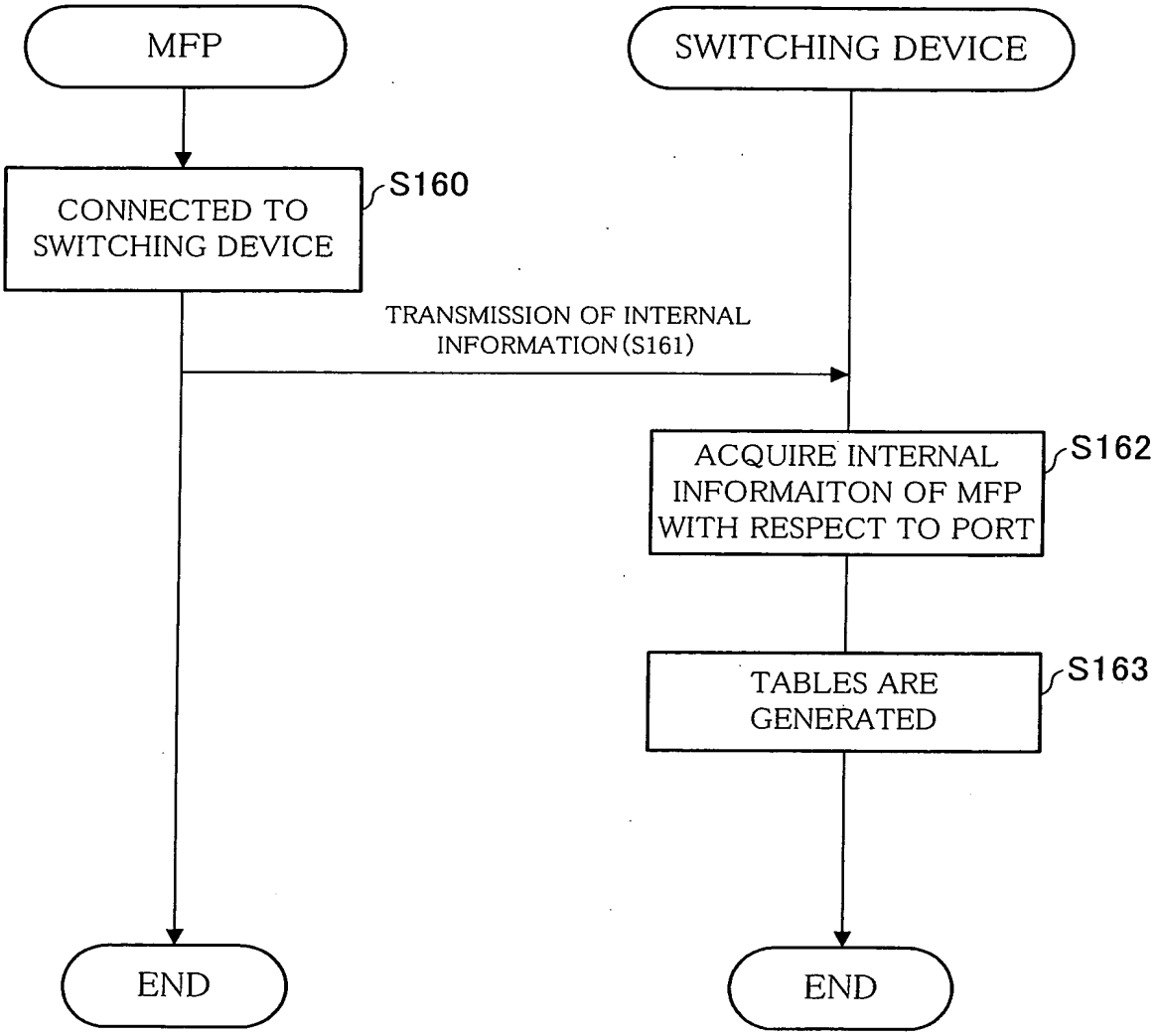


FIG. 25

STATUS TABLE

MAC ADDRESS	DEVICE INFORMATION	STATUS
MAC ADDRESS 1	MFP, ABILITY	active
MAC ADDRESS 2	MFP, ABILITY	standby
MAC ADDRESS 3	MFP, ABILITY	off

FIG. 26

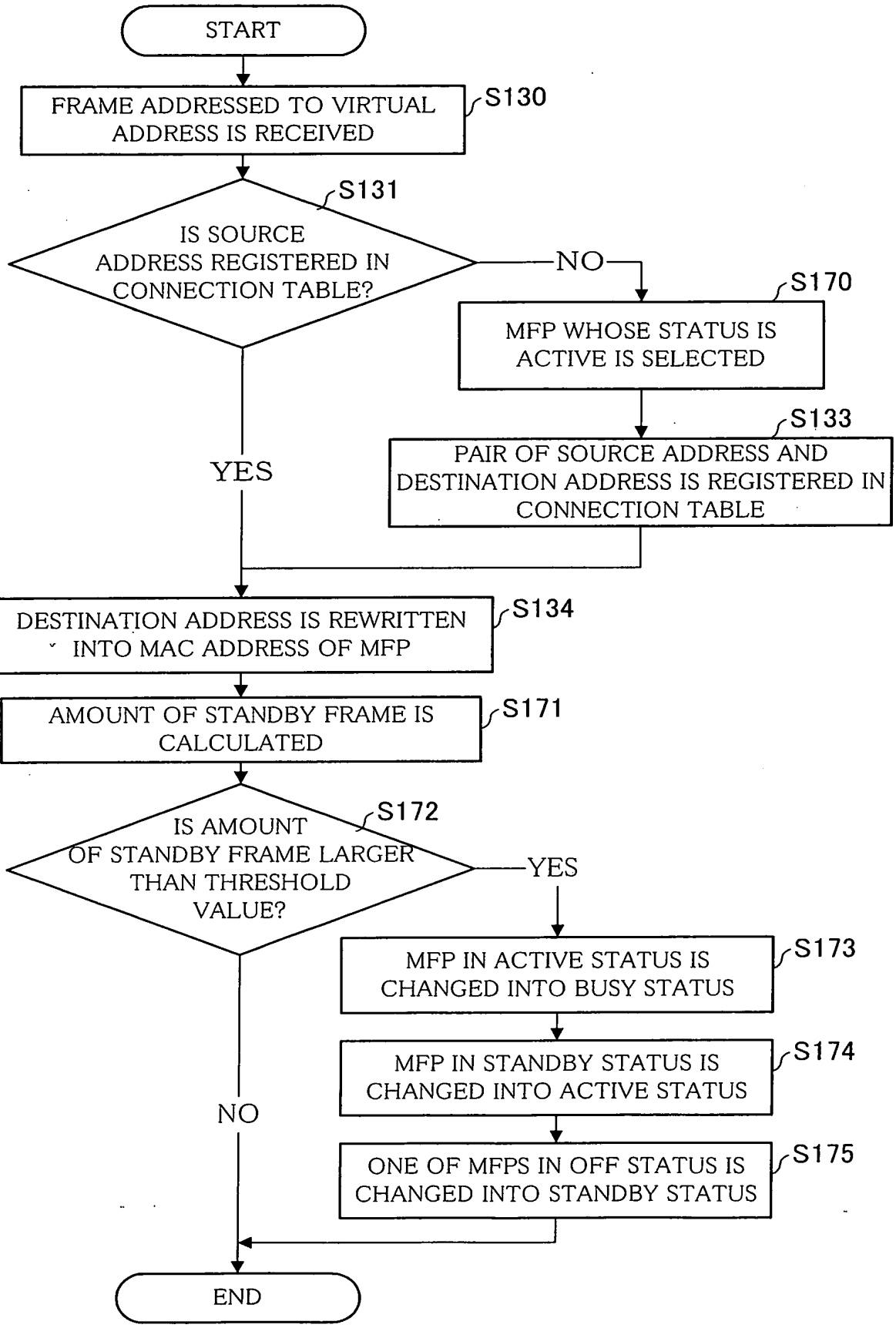

START
FRAME ADDRESSED TO VIRTUAL ADDRESS IS RECEIVED
S130
S131
IS SOURCE ADDRESS REGISTERED IN CONNECTION TABLE?
NO
S170
MFP WHOSE STATUS IS ACTIVE IS SELECTED
S133
PAIR OF SOURCE ADDRESS AND DESTINATION ADDRESS IS REGISTERED IN CONNECTION TABLE
YES
DESTINATION ADDRESS IS REWRITTEN INTO MAC ADDRESS OF MFP
S134
AMOUNT OF STANDBY FRAME IS CALCULATED
S171
S172
IS AMOUNT OF STANDBY FRAME LARGER THAN THRESHOLD VALUE?
YES
MFP IN ACTIVE STATUS IS CHANGED INTO BUSY STATUS
S173
MFP IN STANDBY STATUS IS CHANGED INTO ACTIVE STATUS
S174
ONE OF MFPS IN OFF STATUS IS CHANGED INTO STANDBY STATUS
S175
NO
END

FIG. 27

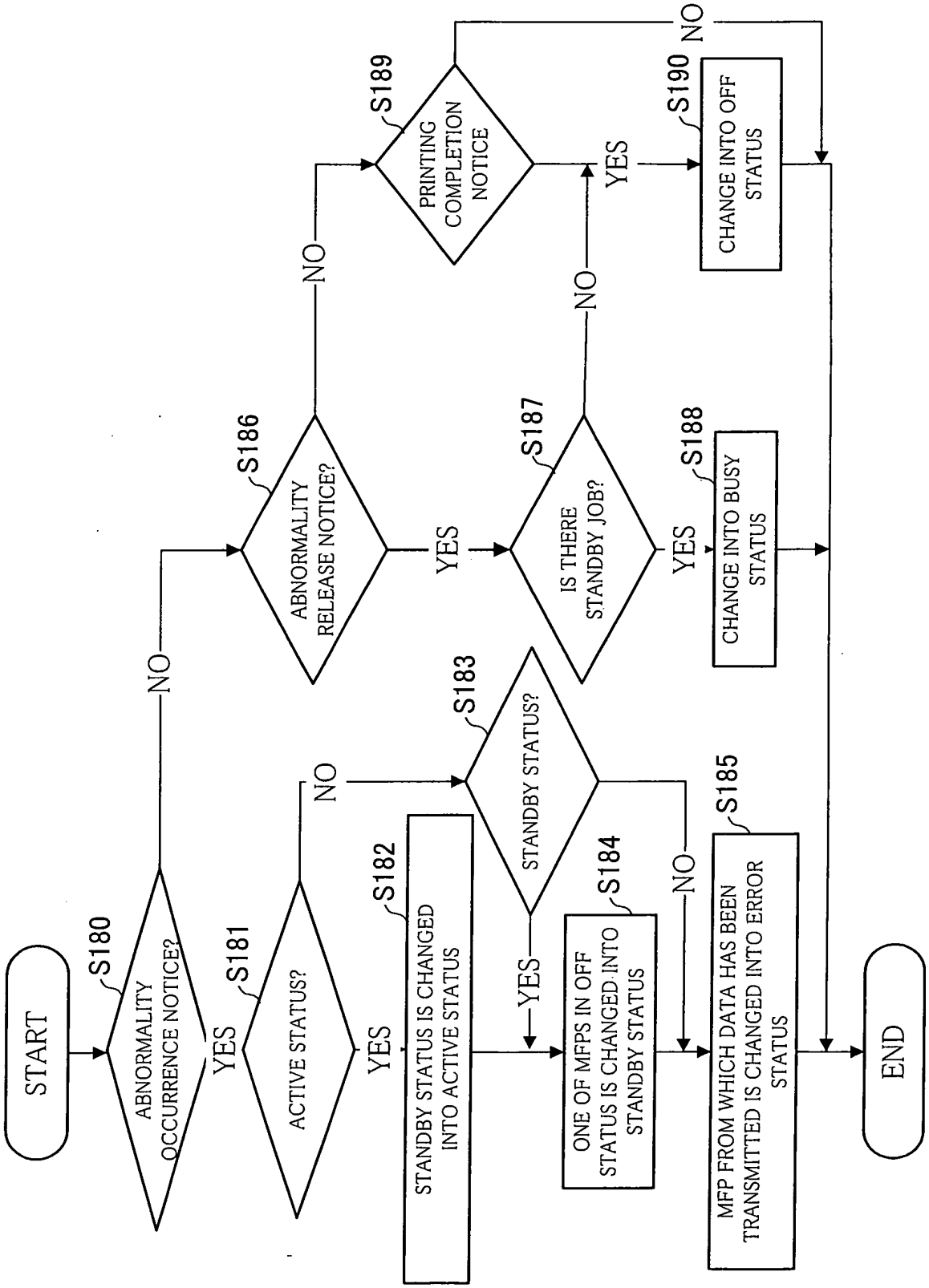

START
S180
ABNORMALITY OCCURRENCE NOTICE?
YES
NO
S181
ACTIVE STATUS?
YES
NO
S182
STANDBY STATUS IS CHANGED INTO ACTIVE STATUS
S183
STANDBY STATUS?
YES
NO
S184
ONE OF MFPS IN OFF STATUS IS CHANGED INTO STANDBY STATUS
S185
MFP FROM WHICH DATA HAS BEEN TRANSMITTED IS CHANGED INTO ERROR STATUS
S186
ABNORMALITY RELEASE NOTICE?
YES
NO
S187
IS THERE STANDBY JOB?
YES
NO
S188
CHANGE INTO BUSY STATUS
S189
PRINTING COMPLETION NOTICE
YES
NO
S190
CHANGE INTO OFF STATUS
END

FIG. 28

CONNECTION TABLE

HOST MAC ADDRESS	HOST IP ADDRESS	HOST PORT NUMBER	PRINTER MAC ADDRESS	PRINTER IP ADDRESS	PORT NUMBER	TIMER
MAC ADDRESS A	IP ADDRESS A	:x	MAC ADDRESS 1	IP ADDRESS 1	PORT NUMBER FOR PRINTER	T1 SECOND
MAC ADDRESS B	IP ADDRESS B	:y	MAC ADDRESS 2	IP ADDRESS 2	PORT NUMBER FOR PRINTER	T2 SECOND
MAC ADDRESS A	IP ADDRESS A	:x'	MAC ADDRESS 3	IP ADDRESS 3	PORT NUMBER FOR PRINTER	T3 SECOND

FIG. 29

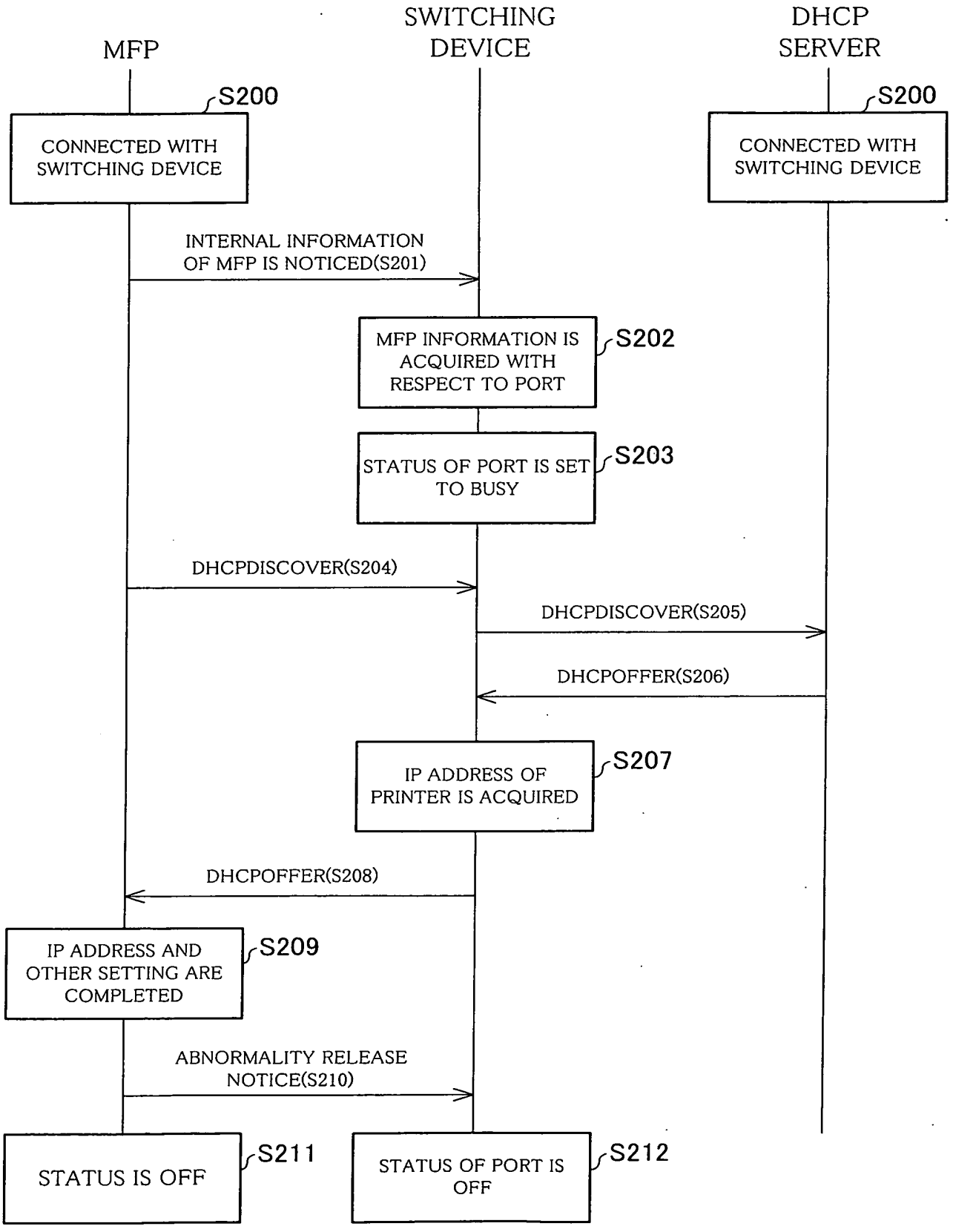

MFP
SWITCHING DEVICE
DHCP SERVER
S200
CONNECTED WITH SWITCHING DEVICE
S200
CONNECTED WITH SWITCHING DEVICE
INTERNAL INFORMATION OF MFP IS NOTICED(S201)
MFP INFORMATION IS ACQUIRED WITH RESPECT TO PORT
S202
STATUS OF PORT IS SET TO BUSY
S203
DHCPDISCOVER(S204)
DHCPDISCOVER(S205)
DHCPOFFER(S206)
IP ADDRESS OF PRINTER IS ACQUIRED
S207
DHCPOFFER(S208)
IP ADDRESS AND OTHER SETTING ARE COMPLETED
S209
ABNORMALITY RELEASE NOTICE(S210)
STATUS IS OFF
S211
STATUS OF PORT IS OFF
S212

FIG. 30

ADDRESS TABLE

MAC ADDRESS	PORT	DEVICE INFORMATION	STATUS
MAC ADDRESS 1	P1	MFP,ABILITY	active
MAC ADDRESS 2	P2	MFP,ABILITY	standby
MAC ADDRESS 3	P3	MFP,ABILITY	off
MAC ADDRESS A	P4	HOST	-
MAC ADDRESS B	P5	HOST	-
VIRTUAL MAC ADDRESS	-	virtual	-
MAC ADDRESS OF SWITCHING DEVICE 100	-	own	-